UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/662,347	09/16/2003	Akshaya Kumar	2343-172-27	2071

7590 11/15/2005

Supervisor, Patent Prosecution Services
PIPER RUDNICK LLP
1200 Nineteenth Street, N.W.
Washington, DC 20036-2412

EXAMINER	
GEISEL, KARA E	

ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 11/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

88

Office Action Summary	Application No.	Applicant(s)	
	10/662,347	KUMAR ET AL.	
	Examiner	Art Unit	
	Kara E. Geisel	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26 and 29-31* is/are rejected.

7)☒ Claim(s) *27 and 28* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *0204, 0504*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

The information disclosure statements filed May 13th, 2004, and February 9th, 2004, have been considered by the examiner.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 4 and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 4 and 13 recite the limitation "the harmonic separator" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 5-11, 14-26, and 29-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Samek et al. ("Laser induced breakdown spectroscopy: a tool for real-time, in vtiro and in vivo identification of carious teeth").

In regards to claims 1, 10 and 19, Samek discloses a laser induced breakdown spectroscopy (LIBS) apparatus (fig. 1) and a method of using the system comprising a laser light source (page 4, "the laser system"), a detector, (pages 5-6, "the system for spectral analysis"), and a probe for directing laser

light from the laser light source to a biological sample (pages 7-8 "sample under analysis"), wherein the laser light is directable through the probe to a sample in vivo to generate an emission spectrum and the emission spectrum from the biological sample is capturable for a recording, a real-time analysis or a subsequent analysis (pages 4-5, "the light delivery and collection system", page 6, "discriminate analysis", and pages 7-8, "samples under analysis").

In regards to claims 2 and 11, the apparatus further comprises a data acquisition or analysis system with optionally a separate data processor (page 7, "material identification and the Mahalanobis distance method of spectrum matching").

In regards to claims 5 and 14, the apparatus further comprises a coupling lens for coupling the laser light at an input end of a multi-modal optical fiber (pages 4-5, "the light delivery and collection system").

In regards to claims 6 and 15, the emission spectrum is collected either in the same fiber or in another fiber to travel in a backward direction to a spectrometer (pages 4-5, "the light delivery and collection system").

In regards to claims 7 and 16, the laser light source is a CO_2 laser, a Ruby laser, a long pulse YAG laser, and Alexandrite laser, an ER:YAG laser, an intense pulsed light laser, a KTP laser, a diode laser, or a pulse dye laser (page 4, "the laser system").

In regards to claims 8 and 17, the laser light source is a pulsed Nd:YAG laser (page 4, "the laser system").

In regards to claims 9, 18 and 31, the apparatus is part of a laser scalpel (pages 2-3, "background" ¶s 2-4).

In regards to claim 20, the method further comprises comparing the emission spectrum with a control emission spectrum to determine the presence or absence of health of a host organism from which

the biological sample is tested (page 7, "material identification and the Mahalanobis distance method of spectrum matching").

In regards to claims 21 and 22, the method further comprises analyzing the emission spectrum to determine the presence or absence and the quantity of at least one trace element (page 11, "application of the Mahalanobis distance method to mapping of carious teeth", ¶ 7).

In regards to claim 23, the method further comprises evaluating the light emitted from the sample by calculating the concentration of at least one chemical element from a sample, comparing the concentration of the chemical element in the sample with a range of concentrations of the chemical element in a standard, and classifying the sample as normal or abnormal (pages 10-12, "application of the Mahalanobis distance method to mapping of carious teeth").

In regards to claim 24, the method further comprises directing the laser light through a probe onto the sample in vivo (pages 7-8, "sample under analysis").

In regards to claim 25, the sample is tissue (teeth are defined as calcified tissue).

In regards to claim 26, the sample source is a human (pages 7-8, "sample under analysis").

In regards to claim 29, the method is practiced to detect or diagnose a disease (page 7, "material identification and the Mahalanobis distance method of spectrum matching").

In regards to claim 30, the method could be practiced in any analysis, including forensic analysis.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 3-4 and 12-13 are rejected under 35 U.S.C. 103(a) as being obvious over Samek et al. ("Laser induced breakdown spectroscopy: a tool for real-time, in vtiro and in vivo identification of carious teeth") in view of Singh et al (USPN 5,751,416), as cited by applicant.

In regards to claims 3-4 and 12-13, Samek does not disclose that the apparatus includes a harmonic separator and a dichroic mirror for reflecting laser light from the harmonic separator. However, this is merely a means of directing the laser light from the laser to the sample, and it would be obvious to one of ordinary skill in the art to replace the mirror and fiber system of Samek's with a harmonic separator and dichroic mirror as an alternate embodiment as the means for directing the laser light from the laser to the sample.

For example, Singh discloses a LIBS apparatus similar to Samek's apparatus. The means to direct the laser light form the laser to the sample is a harmonic separator and dichroic mirror (fig. 1, 3-4). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace Samek's fiber and mirror with a harmonic separator and dichroic mirror as an alternate means to direct the laser light from the laser to the sample.

Allowable Subject Matter

Claims 27-28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

As to claim 27, the prior art of record, taken alone or in combination, fails to disclose or render obvious a method of using a LIBS system wherein the method is practiced to detect cancer, in combination with the rest of the limitations of claim 27.

As to claim 28, the prior art of record, taken alone or in combination, fails to disclose or render obvious a method of using a LIBS system wherein the method is practiced to detect breast cancer, in combination with the rest of the limitations of claim 28.

Additional Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art made of record is Alexander (USPN 5,847,825), and Zhang et al. (USPN 6,762,835).

Alexander discloses a LIBS system.

Zhang discloses a LIBS system.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kara E Geisel whose telephone number is **571 272 2416**. The examiner can normally be reached on Monday through Friday, 8am to 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on **571 272 2800 ext. 77**. The fax phone number for the organization where this application or proceeding is assigned is **571 273 8300**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Gregory J. Toatley, Jr.
SPE
Art Unit 2877

K.G.

KEG
November 11, 2005